

## SECTION 2 - 6

## SECTION SUMMARY

## Is There Life Beyond Earth?

## Guide for Reading

- 2
- ◆ What conditions do living things need to exist on Earth?
  - ◆ Why do scientists think Mars and Europa are good places to look for signs of life?

All living things on Earth have several characteristics in common. Living things are made up of cells. Living things take in energy and use it to grow and develop. They reproduce and give off waste.

**Earth has liquid water and a suitable temperature range and atmosphere for living things to survive.** These are sometimes called the “Goldilocks conditions.” Are these conditions necessary for life? Or are they just conditions that Earth’s living things happen to need? Scientists only have life forms on Earth to study. Until they find life somewhere else, there is no way to answer these questions. Life other than that on Earth would be called **extraterrestrial life**.

On Earth, scientists have recently discovered life forms that live outside the range of conditions they once thought necessary to support life. There are giant tube worms that live in the deep ocean at a very high pressure in the dark. Scientists have also discovered single-celled life forms that get their energy from chemicals rather than sunlight. Other scientists have found life surviving in hot springs that had been thought to be too hot to support life. Perhaps life forms exist that do not need the “Goldilocks conditions.”

In 1970, a spacecraft found regions on the surface of Mars that look like streambeds with crisscrossing paths of water. **Since life as we know it requires water, scientists hypothesize that Mars may have once had the conditions needed for life to exist.** In 1976, twin *Viking* spacecraft each carried a small biology laboratory that tested to see if there were life forms on Mars that used oxygen and gave off carbon dioxide. None of these tests showed any evidence of life.

In 1996, scientists studied a meteorite from Mars found in Antarctica. They found tiny shapes that looked like fossils—remains of ancient life preserved in rock. Other scientists think that the shapes are not fossils but may have come from lumps of hardened clay formed on Mars. Or they may have been formed when snow got into cracks in the meteorite after landing on Earth.

Many scientists think that one of Jupiter’s moons, Europa, may have conditions for life to develop. Photos from *Voyager* and *Galileo* showed that Europa has a very smooth icy crust with giant cracks in it. Could that mean that there is a liquid ocean under Europa’s ice? The water in the ocean could possibly be kept warm by heat coming from inside Europa. **If there is liquid water on Europa, there might also be life.** People will have to wait for the next generation of space probes to find out.

## SECTION 2-6

## REVIEW AND REINFORCE

# Is There Life Beyond Earth?

### ◆ Understanding Main Ideas

*Answer the following questions. Use a separate sheet if you need more room.*

**1.** What are three characteristics that all living things on Earth have in common?

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**2.** What does the phrase “Goldilocks conditions” refer to?

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**3.** What are the three “Goldilocks conditions”?

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**4.** Scientist have discovered unusual life forms on Earth such as animals that live in the ocean at very high pressure in the dark and others that get their energy from chemicals. Using this information, what do scientists infer about the conditions necessary for life on other planets?

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**5.** Spacecraft sent to Mars have found regions on the surface of Mars that look like stream beds. Why do these regions lead scientists to hypothesize that there may have once been life on that planet?

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**6.** Why do scientist think that Europa might have the conditions for life to develop?

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### ◆ Building Vocabulary

*Write a definition for the following term on the lines below.*

**7.** extraterrestrial life

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